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10/572,753	03/21/2006	Hajime Nakamura	062281	9440

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EXAMINER	
HOBAN, MATTHEW E	
ART UNIT	PAPER NUMBER
1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/572,753	NAKAMURA ET AL.	
	Examiner	Art Unit	
	Matthew E. Hoban	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 March 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10 and 12-17* is/are rejected.

7)☒ Claim(s) *11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/29/09 and 10/17/08* .
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 5/29/09 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because it includes documents not in the English language, where the relevance of these documents are not explained. These documents are struck through on the 1449. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claims now recite the limitation that the

magnetic form must be greater than .5 mm in dimension as well as similar limitations in claims 15-17. This limitation is not supported by the specification, as this range of numbers was not immediately appreciated in the disclosure and only functions to circumvent certain prior art. The disclosure immediately recognizes lower limits of .005mm and .001 mm but not .5 mm. New or amended claims which introduce elements or limitations which are not supported by the as-filed disclosure violate the written description requirement. See, e.g., *In re Lukach*, 442 F.2d 967, 169 USPQ 795 (CCPA 1971) (subgenus range was not supported by generic disclosure and specific example within the subgenus range); *In re Smith*, 458 F.2d 1389, 1395, 173 USPQ 679, 683 (CCPA 1972) (a subgenus is not necessarily described by a genus encompassing it and a species upon which it reads). See MPEP 2163 IB and 2163.05.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-10 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimura in 4859255 in view of Kim in 7163591 and further in view of Beeby in his publication entitled “Micromachined silicon Generator for Harvesting Powder from Vibrations” or Gao in “Effects of the degree of grain alignment on the hard magnetic properties of sintered NdFeB magnets”, independently.

Regarding Claim 1: Fujimura teaches permanent magnets of the (Fe,Co)-B-R family (wherein the amount of Co can be 0) (See Abstract). These magnets are made by the basic steps as set forth in column 8, lines 25-50, with an additional optional aging step which can be performed at from 350 to the sintering temperature, where in the sintering

temperature is defined as anything between 900 and 1200 C (See Column 8, Lines 5-20).

Fujimura does not use a heat treatment where a powder of a fluoride of R is disposed on the sintered magnet form.

However, Kim teaches that by incorporating a heat treatment step wherein DyF_3 is disposed with the sintered magnetic composition in order to increase many of the properties of the form. The specific properties improved include iHc, M (See Paragraph 49-51), as well as increasing the microstructural soundness and uniformity of the grains as well as increasing the smoothness of the surface. This leads to a lower nucleation rate of reversed domains, leading to higher coercivity (See Paragraph 53-56).

Therefore, it would have been obvious based on the teachings of Kim to include a heat treatment step including Dysprosium Fluoride with the sintered form, after the initial sintering of the composition. This fits well with the Fujimura reference, as this reference also uses a sintering step. Therefore, the magnetic form of Fujimura could have similar improvements in the above stated properties as taught by Kim. This would provide ample motivation to one of ordinary skill in the art to combine these references

Fujimura is silent as to the created magnets as far as their intended dimensions go.

However, NdFeB magnets of dimensions 1mm x 1mm x .75 mm are known within the art and are used for Micro Generators as can be seen in the publication of Beeby (See Section 4). Therefore, as magnets of these dimensions are needed, it would be obvious to produce a magnet with these dimensions as a matter of necessity. Thus it would be obvious for one of ordinary skill in the art to produce such magnets motivated by the need for magnets for use in Micro Generators.

Alternatively, Gao teaches that it is known to create NdFeB magnets of 8mm diameter and 10 mm length (See Experimental). Therefore, this geometry is known within the art and it would be obvious to form the matter of the applied art into such a geometry based on the fact that Fujimura is not limited to any particular geometry. The motivation for this combination is based on the necessity for these magnets to be produced in various forms for various applications.

Regarding Claims 2-3 and 16: Fujimura teaches that magnets of the size 1mm x 1mm x .75 mm are desired within the art of creating microgenerators.

Regarding Claims 2, 15-17: Gao teaches that magnets of 8mmx8mmx10mm size are known in the art and would thus be obvious to make.

Regarding Claim 4: The filling factor of the rare earth fluoride as used by Kim is at least 10% which is evidenced by the fact that the surrounding space contains no other

fillers aside from the rare earth fluorides. Thus the filling factor of the rare earth fluoride as compared to other fillers would be greater than 10% and would be nearly 100%.

Regarding Claim 5: The particle size of the fluoride as used by Kim is between .1 and 50 microns as evidenced by line 36 of column 3.

Regarding Claim 6: At column 5, Lines 17-25 Kim gives several options for the R-fluoride useful in his invention including fluorides where R is Dy. A broader embodiment of his invention at Lines 40-45 of Column 3 also includes Tb as a suitable R type element. Therefore if only Dy or Tb fluoride is used the atomic percent of Dy or Tb in these powders would be 100%.

Regarding Claim 7: As stated previously, Kim gives a method in Column 3 where R-fluoride powders are heat treated in conjunction with R-Fe-B magnets. This heat treatment would inherently create diffusion of both R and fluoride Atoms into the R-Fe-B magnet and vice versa, meaning that some amount of Fluorine would inherently be absorbed by the magnetic particles. This phenomenon is noted by Kim at column 5, line 60 through column 6, line 5.

Regarding Claim 8: At Column 4, Line 57-62 Kim draws particular attention to the Nd-Fe-B magnet system. This system is characterized by the formula Nd2FeB14.

Therefore, this magnet contains 11.6 at% Nd. Although other formulae are known with slightly higher conc. of rare earth.

Kim goes on to draw particular attention to the effects of Dysprosium Fluoride, where this fluoride is used to increase and maximize iHc of the sintered magnetic form. Dysprosium Fluoride contains 100 at% Dy and contains 0 at% Nd (See Column 5, Lines 25-28). Thus a system using Nd-Fe-B as a sintered magnetic form and Dysprosium Fluoride as an additive meets all the limits of Claim 8.

Regarding Claim 9: Kim teaches using only R-Fluorides in the additive, which are comprised only of such fluorides. Thus the balance could be considered to be composed of nitrides, oxides, hydroxides and hydrides of R, since compounds such as oxides and hydroxides would be common impurities. Nevertheless, Kim teaches powders comprising entirely R-Fluorides so the balance of the composition outside of R-Fluorides would essentially be 0. The claim language does not necessarily state that the powder can not be entirely comprised of Fluoride and therefore does not necessitate the inclusion of nitrides, oxides, hydrides, carbides, or hydroxides.

Regarding Claim 10: The process of Fujimura in view of Kim would include the heat treatment of Kim between the sintering and aging of the powders. Kim teaches that the aging of NdFeB magnets occurs at a temperature between 350 and the sintering temperature, wherein the sintering temperature is between 900-1200C (See Column 8).

The intermittent heat treatment to dispose DyF_3 on the magnetic forms to improve their properties is from 500-1100C (See Column 2, Lines 0-10). Therefore within this combination of references, the sintering temperature can be greater than the heat treatment temperature, which in turn is greater than the aging temperature.

1. Claims 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimura in 4859255 in view of Kim in 7,163,591 and further in view of Beeby or Gao as applied to claim 1 above, and further in view of Mitsuji in 5286366.

2.

Please review the rejection under Fujimura in view of Kim and further in view of Beeby or Gao to understand the scope of this invention.

The applied art does not teach using an acid, alkali, or organic solvent to clean the magnet form.

Mitsuji, however, teaches that it is beneficial to add several other layers to the surface of a Nd-Fe-B type magnet due to this composition's inherently poor chemical resistance. This is improved by adding nickel and copper coatings to prevent chemical degradation (See Abstract). In order to add this layer the magnet must first have its outer surface layer removed, since this layer has been degraded by the manufacturing process. The magnet is thus etched with nitric

and acetic acid to remove from 5-20 microns (See Column 5, Lines 10-35). The layers are then applied to the magnetic material. The use of this process would clean the surface of the magnetic form in order to allow the plating process to occur.

One of ordinary skill in the art would have found that this process of Mitsuji would be highly applicable to the magnetic material as described by Fujimura in view of Kim and further in view of Beeby or Gao.

The process of altering the surface of the article, necessitates that the article's composition can be acted upon and thus would require the removal of oxide layers which would inhibit the diffusion of the Dy or F to the magnetic core. Therefore, the process of cleaning a magnet prior to post processing would be obvious and motivated in the view of one of ordinary skill in the art. Another cleaning step prior to the final coating process would also be obvious since the disposal of the Dy-fluoride powder requires a heat treatment step, in which the oxide skin would redevelop and would subsequently need to be removed by the same process prior to the plating operation.

3. Claims 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in 7,163,591 as applied to claim 1 above, and further in view of Hamada in 6777097.

Please review the rejection under Fujimura in view of Kim and further in view of Beeby or Gao to understand the scope of this invention.

The applied art does not teach a shot peening step prior to disposing the powder on the sintered magnet.

Hamada, however, teaches that it is beneficial to add a composite coating to the surface of a Nd-Fe-B type magnet due to this composition's inherently poor chemical resistance. This is improved by adding a silicone resin along with flakes of fine powder to prevent chemical degradation (See Abstract). In order to add this layer the magnet must first have its outer surface layer removed, since oxidation must be removed from the surface of the magnet. The magnet can thus be put through several different processes to attain this goal, such as shot blasting or cleaning with caustic fluids (See Column 5, Lines 30-60). The layers are then applied to the magnetic material. The use of this process would clean the surface of the magnetic form of oxides in order to allow the plating process to occur. Thus under this interpretation the particles of Kim are an initial magnetic form, where the formed particles represent a final magnetic form. The term magnetic form is never explicitly defined. After dip coating the composite magnet is heat treated to decompose the silicone resin into silica (See Column 5, Lines 5-15).

The process of altering the surface of the article, necessitates that the article's composition can be acted upon and thus would require the removal of oxide layers which would inhibit the diffusion of the Dy or F to the magnetic core. Therefore, the process of cleaning a magnet by shot peening prior to post processing would be obvious and motivated in the view of one of ordinary skill in the art.

Allowable Subject Matter

4. Claim 11 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter: The wet processing method is starkly different from the prior art, where this is a dry process. The wet processing methods known in hard magnet processes are an entirely different method from those seen in the bonded magnets of the prior art and the instant claims.

Response to Arguments

6. Applicant's arguments with respect to claims 1-17 have been considered but are moot in view of the new ground(s) of rejection. The new rejection of all claims under 103, are now based on the primary reference Fujimara, which teaches bulk magnets, Which is in turn modified by Kim among others. Arguments as to Kim and the previously cited art will be commented upon. Arguments as to Kim teaching the negative effects of oxides and chlorides is insignificant in that Kim does in fact teach the advantageous effects of fluorides. The claims are not directed to solely chlorides or oxides and also include fluorides. In that Kim teaches the advantageous effect of fluorides, the claims are obvious. Statements concerning the interpretation of claims 6 and 8 are noted and the rejection has been altered to incorporate this. It is further noted that a terminal disclaimer has been filed, thus the provisional ODP rejection has been withdrawn.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Hoban whose telephone number is (571) 270-3585. The examiner can normally be reached on Monday - Friday from 7:30 AM to 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J.A. LORENGO/
Supervisory Patent Examiner, Art Unit 1793

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